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TWENTY-SECOND ANNUAL REPORT OF THE DIRECTOR.

SUBMITTED TO THE TRUSTEES JANUARY 11, 1911.

To the Board of Trustees of the Missouri Botanical Garden:

The following report on the Missouri Botanical Garden and the School of Botany therewith connected is respectfully submitted, in compliance with your rules.

GARDENING.

No considerable changes in the ground allotted to decorative plants are to be reported, though rearrangements of detail and selection of varieties have enabled the gardeners to secure a rather more attractive general effect and a decidedly better persistence of color masses through the season.

As has been the practice for some years past, the sunken garden was occupied by early-flowering tulips, flanked this year by the later Darwin and parrot types; and in this display some 28,800 bulbs, representing 222 varieties, were used.

During the summer and early fall, the same ground was occupied by choice bedding-plants. Among the forms utilized this season *Alternanthera* (5,000), *Sedum* (4,000), *Echeveria* (4,000), *Pelargonium* (3,000), *Coleus* (2,500), *Celosia* (1,800), *Peristrophe* (1,800), *Gladiolus* (1,500), *Antirrhinum* (1,500), *Canna* (1,200), *Sweet Alyssum* (1,200), *Salvia* (1,000), *Ageratum* (1,000), *Pansies* (1,000), etc., figured prominently. For this and similar purposes 38,000 plants were used,—about 5,000 more than in 1909.

Through the fortnight beginning with November 14th, the parterre was occupied by a tented display of 2,250 chrysanthemums, representing 502 varieties, which in perfection of



THE CAPE DAISY.

growth, effectiveness of grouping, and the number of exceptionally large plants has not before been equaled at the Garden.

As in the preceding year, *Oenotheras* have been grown in large numbers, from seed of known parentage, primarily as material for continued investigation by Dr. Gates. About 4,000 of these plants, representing 70 forms, of which 39 were pure races and 31 artificial hybrids, were carried through the season.

Plant and seed additions for the year may be tabulated as follows:

	Accessions	Plants or Packets	Value
Bought	32	5,624	\$ 459.31
Presented	262	5,572	407.71
Collected by employees			
In the Garden	1	2,950	513.30
Elsewhere	22	1,924	156.03
	317	16,070	\$1,536.35
Cuttings raised	1	17,103	855.15
Seedlings raised	1	31,513	2,205.91
	319	64,686	\$4,597.41

The exchange seed list issued at the beginning of the year included 2,643 species and varieties; and 9,538 packets of seeds, valued at \$476.90, have been distributed to correspondents who made selections from the list. Living plants to the number of 277, valued at \$35.40, have been distributed to exchanging institutions.

Apart from the regular exchanges, 520 surplus plants, valued at \$57.35, have been presented to schools and colleges for educational use; and 727 plants, removed from the ground on the approach of winter or remaining after the spring planting, were given to charities. On the conclusion of the chrysanthemum show, 2,500 cut flowers were distributed among the hospitals, etc., through the kindly intermediary of the Flower Committee of the Eighth District of Women's Clubs.

PLANTS CULTIVATED.

Species or varieties to the number of 900 were added to the living collections in the course of the year, and 590 forms were lost or discarded, making a net gain of 310, and bringing the total recorded as now in cultivation to 12,074, in contrast with the 11,764 noted for 1909.¹ These forms represent 1,820 genera, belonging to 203 natural families,² a net addition of 43 genera and 6 families.

Classified as to hardiness and other features of gardening interest, the collection now comprises

Thallophytes (Agaricaceae)	5	
Bryophytes	10	
Pteridophytes	214	
Spermatophytes		
Gymnosperms		
Cycads	30	
Conifers	111	
Angiosperms		
Trees and shrubs	1,715	
Hardy and annual herbs	3,857	
Tender plants		
Orchids	659	
Other Monocotyledons . . .	1,840	
Dicotyledons	3,633	11,704
		<hr/>
		12,074

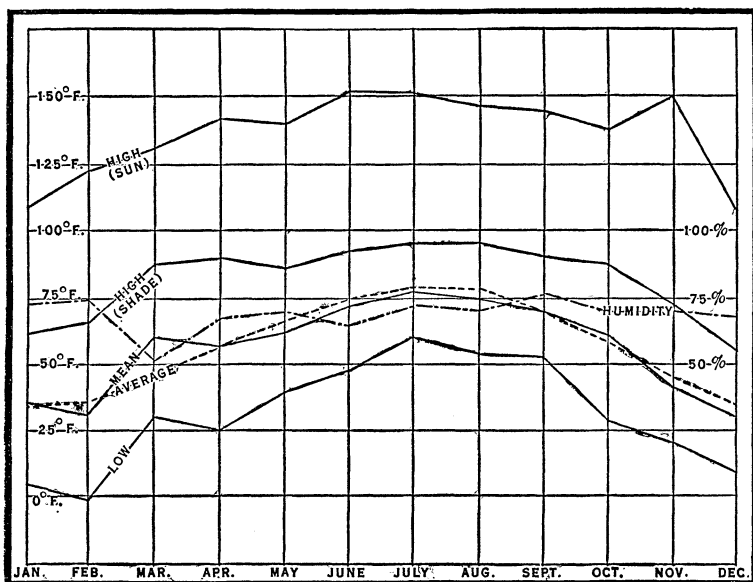
THE WEATHER.

The season just closed (diagrams 'A and B) has varied from the average in several respects,—on the whole unfavorably. Through most of the year the mean monthly temperature ran somewhat below the St. Louis average, exceeded materially only in March; but though the daily mean for April was normal, the month was marked by a severe freeze which wrought serious havoc with plants, all of which were in

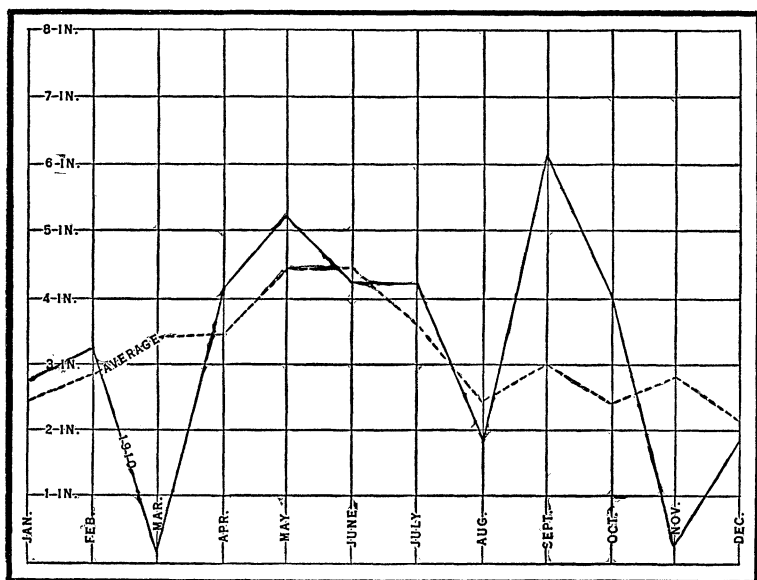
¹ Rept. Mo. Bot. Gard. 21:12.

² See list in Rept. Mo. Bot. Gard. 21:12. — Two families lost (Empetraceae and Loranthaceae). Eight families added (Callitrichaceae, Ceratophyllaceae, Datisceae, Frankeniaceae, Globulariaceae, Goodeniaceae, Isoetaceae, and Trochodendraceae).

DIAGRAMS A AND B.



A.—TEMPERATURE AND HUMIDITY, 1910.



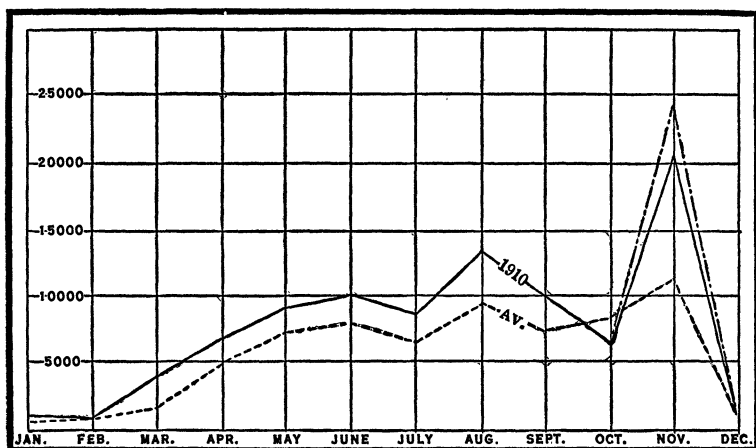
B.—PRECIPITATION, 1910.

full vegetation. The total precipitation (37.3 in.), though extremely close to the normal (37.4 in), departed from this in severe droughts in March and November and in a very marked excess of rainfall in September and October,—the spring drought, in conjunction with the unusual warmth, affecting vegetation unfavorably, while the early fall rains lessened the number of visitors to the Garden.

VISITORS.

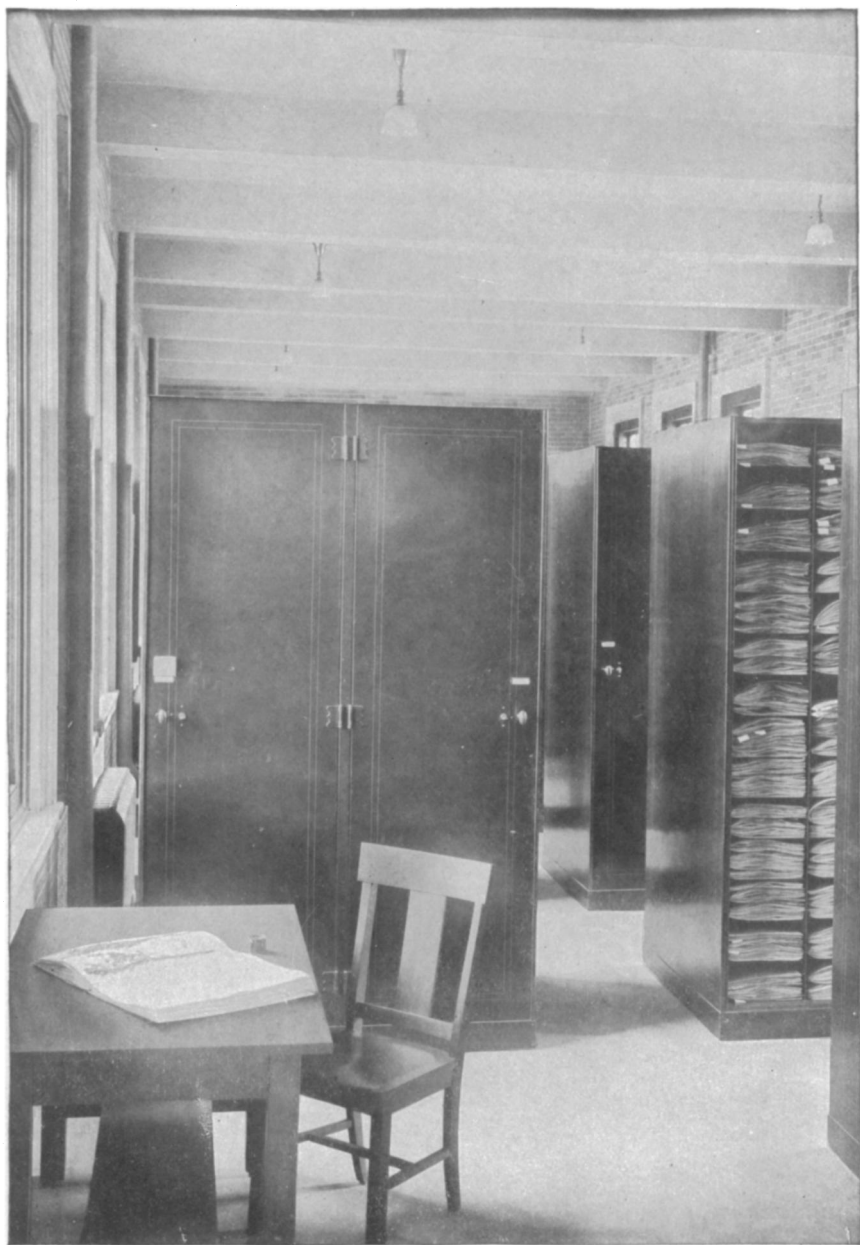
I am again able to report an increase in the number of week-day visitors, of whom 91,914 were counted at the gates.

DIAGRAM C.



WEEK-DAY VISITORS, 1910.

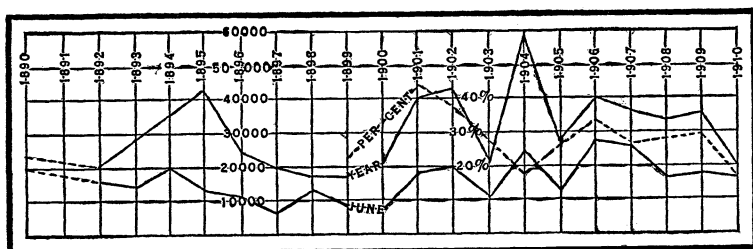
Of this number, 19,377 were attracted by the display of chrysanthemums, which was again made accessible to the public in the evening through the courtesy of Captain Robert McCulloch in providing means of lighting the tent. Notwithstanding this gratifying increase in the number of week-day visitors, the total number for the year falls about nine thousand behind the corresponding total for 1909, because of stormy weather on the first Sunday in September. On the



IN THE HERBARIUM.

June "open Sunday," about the average number was recorded,—17,406, but on the September Sunday the approximately equal average was met by a record of only 2,297, bringing the Sunday visitors for the year to only 19,703, and the total for the year to 111,617. The distribution of week-day visitors through the season, as compared with the previous average, and the relation of the 19,703 Sunday visitors to those of earlier years, and to the total for this year (17.6%), are indicated in diagrams C and D.

DIAGRAM D.



SUNDAY VISITORS, 1890 TO 1910.

An interesting feature of the year, which brought unusually distinguished—if few—visitors, was a meeting of the National Academy of Sciences, held in the graduate lecture-room of the Garden on the eighth, ninth and tenth of November.

THE HERBARIUM.

Additions to the incorporated herbarium number 26,287 sheets of specimens, of which 10,908, valued (unmounted) at \$545.40, were presented or received by way of exchange; 1,572, valued at \$78.60, were collected by employees; and 13,807 were purchased, the Secretary's books showing an expenditure during the year of \$1,664.15 for specimens and material. Exchange distributions comprise 545 unmounted specimens, valued at \$27.25.

Apart from a relatively small amount of unincorporated material, the herbarium now consists of:

The Engelmann Herbarium (all groups) 97,859

The General Herbarium:—

Higher plants.

The J. J. Bernhardt Herbarium .	63,705	
The Henry Eggert Herbarium .	26,704	
The J. H. Redfield Herbarium .	16,447	
The Sturtevant and Smith Herbarium	7,446	
The Gustav Jermy Herbarium .	5,118	
The A. W. Chapman Herbarium	3,536	
The Julien Reverchon Herbarium	17,210	
The Nicholas Riehl Herbarium .	3,359	
Other specimens	383,938	527,463

Thallophytes.

The J. J. Bernhardt Herbarium	4,429	
The Gustav Jermy Herbarium .	1,659	
The S. M. Tracy Herbarium .	4,393	
The Wm. Trelease Herbarium .	11,000	
Other specimens	35,309	56,790

Making a total of 682,112

Valued at \$102,316.80³

Supplementing the herbarium and the shelved or incorporated exsiccatae which are here counted as a part of it,⁴ the Garden possesses specimens of economic plant-products, woods, seeds, etc., valued at \$280.00, and 1,851 listed preparations for microscopic study, valued at \$410.00, which have not been added to since their enumeration in my last report.⁵

For the protection of the very valuable exsiccatae, steel cases corresponding in essentials of design and construction with those used for the regularly mounted herbarium, but of half the standard depth and with adjustable shelves, have been secured this year, and preparations have been made for a systematic enlargement of the collection of microscope slides, and their arrangement in steel cabinets of approved design.

³ This valuation at the rate of \$15.00 per hundred mounted sheets.

⁴ Rept. Mo. Bot. Gard. 16:21.

⁵ Rept. Mo. Bot. Gard. 21:18.

THE LIBRARY.

Additions to the library number 1,622 books; 2,290 pamphlets; 2 manuscripts; and 51,723 index cards. Of these, 1,013 books, valued at \$2,082.00, 2,158 pamphlets, valued at \$372.55, and 2 manuscripts, valued at \$52.00, were received by gift or in exchange; and 609 books and 132 pamphlets were bought, the Secretary's statement showing an expenditure of \$2,580.42 for purchases and binding. Of the index cards, 41,173 were written by employees, and 10,550 were purchased.

The serial publications now received number 1,467; of which 1,363, issued by 982 institutions or publishers, are received in exchange for Garden publications, and the remaining 104 are bought. The number now reported is three more than that noted a year ago.

The Library now contains:

Pamphlets	38,491			
Books	27,075			
		65,566, valued at	\$101,217.76	
Manuscripts	110,	" "	1,590.00	
Total	65,676	" "	102,807.76	
Index cards	771,100	" "	7,711.00	
Total valuation			\$110,518.76	

GARDENING INSTRUCTION.

No essential changes have been made in the course in gardening since this was last outlined⁶ and pupils and teachers remain as at the end of last year, except that early in the season, on nomination of the State Horticultural Society, Mr. Peter Pfaender was granted the scholarship previously held by Mr. Jesse Tuggle.⁷ In March next two of the present holders of scholarships will have completed their work, and the customary announcement of vacancies will be made in the

⁶ Rept. Mo. Bot. Gard. 20:32.

⁷ Rept. Mo. Bot. Gard. 21:23.

course of the winter, so that the scholarships may be re-awarded promptly in the prescribed manner.

UNDERGRADUATE INSTRUCTION.

Undergraduate work in the School of Botany has been changed little from what was reported at the end of last year.⁸ Such modifications as have been made are intended to lay a firmer foundation of precision and method in elementary work as a stepping stone to advanced and professional courses, without detracting from its interest or suitableness as part of a liberal education for those who may elect it for this purpose only. At the beginning of the present college year Mr. P. L. Gainey assumed the duties of Teaching Fellow in botany, an appointment held last year by Mr. C. D. Learn.

Undergraduate enrollment for the first term of 1910-11 is: Botany 1, thirty; Botany 3, nine; Botany 6, five; Botany 9, five; Botany 10, two; Botany 11, two; Botany 17, four; Botany 19, four; special work in histology, three:—a total of 64 students, each taking one full course in botany.

GRADUATE INSTRUCTION AND RESEARCH.

The provision for advanced instruction and research made in 1909.⁹ has been materially increased this year by the establishment of three additional research fellowships, and in memory of the lamented president of the board for two decades, the five have been designated the Rufus J. Lackland Research Fellowships. At the last commencement of Washington University, the Master's degree, in botany, was conferred on Miss Ada Hayden and Mr. E. G. Arzberger,—the holders of fellowships last year—whose theses have been published in the last Garden Report.¹⁰ The holders of the fellowships for the present college year are Miss Caroline

⁸ Rept. Mo. Bot. Gard. 21:22.

⁹ Rept. Mo. Bot. Gard. 21:22.

¹⁰ Rept. Mo. Bot. Gard. 21:25, 60.



THE GRADUATE LABORATORY.

Rumbold and Messrs. H. W. Anderson, C. O. Chambers, S. M. McMurran and Jacob Schramm.

Under the guidance of Professor Moore, these five Fellows, the University Teaching Fellow, and three other graduate students are giving a considerable part or all of their time to advanced study and investigation, either in botany alone or with some cognate subject as a minor in compliance with the rules under which higher degrees are conferred by the University. One other graduate, not a candidate for a degree, is also doing advanced work in the Garden laboratory.

Such time as could be spared from other and necessary duties has been given by myself, Professor Moore and Dr. Gates to original work, some of the results of which have been published.

As in earlier years, the facilities of the Garden have been made accessible to visitors desiring to use them; and during the year just closed 15,308 herbarium specimens have been loaned to 21 persons; and 100 books or pamphlets, to 24 persons not living in St. Louis, in addition to 298 loaned to 56 residents of the city. Information, transcripts from the library, etc., have also been given to many inquirers, through an extensive correspondence. The most important work done at the Garden this year by a person not connected with its own staff was a series of physical, chemical and bacteriological examinations of the milk supply of the poorer parts of the city, with special reference to its influence on the health of little children, made for the School of Social Economy, under the auspices of the Russell Sage Foundation, by Miss Elizabeth Moore.

THE GARDEN STAFF.

No noteworthy changes have been made in the regular staff of library, herbarium and garden, except that because of advancing age Mr. John Bannes, long acting as foreman of the grounds, has been relieved of general responsibility—though continuing his work with the title of foreman emeritus,—the active foremanship being assumed by Mr. Otto

Bogula,—a former garden pupil, subsequently broadly trained and experienced in responsible work both in this country and abroad.

SPECIAL TESTAMENTARY PROVISIONS.

Three of the annual events provided for in the will of Mr. Shaw have taken place in 1910.

The flower sermon was preached in Christ Church Cathedral, St. Louis, on the morning of May 22 by the Right Reverend Charles P. Anderson, Bishop of Chicago.

The sum set apart for floral premiums was once more entrusted to the St. Louis Horticultural Society for award in connection with an exhibition held early in November: no award was made of the Shaw medal.¹¹

The twenty-first banquet to the gardeners of the institution and invited florists, nurserymen and market-gardeners was given at the Southern Hotel on the evening of August 11th, 1910, the Director of the Garden presiding. There were present 129 persons. Following the dinner, speeches appropriate to the occasion were made by Hon. J. H. Gundlach, Acting Mayor of St. Louis; President J. W. Stanton of the American Apple Growers' Congress, which was then meeting in St. Louis; President L. A. Goodman of the American Pomological Society; Professor C. H. Dutcher, representing the State Horticultural Society and the State Board of Horticulture; Secretary J. T. Stinson of the State Fair; Professor W. B. Alwood, of the United States Department of Agriculture; President W. P. Stark of the American Association of Nurserymen; Secretaries Mayo Fesler and Roger Baldwin of the Civic League of St. Louis, and Hon. C. P. Walbridge.

Very respectfully,

WILLIAM TRELEASE,

Director.

¹¹ Rept. Mo. Bot. Gard. 5:18. 9:19. 11:20. 16:29. 19:23.